

RESTRICTED

STAT

Lignite is the most abundant form of coal in the entire country. More than half of the total deposits are found in Oltenia. Other important deposits are located in the regions of Prahova, Arges, Bihor, Stalin, and Severin. Small quantities of lignite occur in Bihor, Timisoara, Hunedoara, and other localities. Extraction of lignite is at present limited to thin strata of an average thickness of one to 2 meters, located near the surface. Crude lignite of the type which occurs in Rumania has a moisture content of 30-40 percent and is a poor heat producer, yielding only 2,700-3,500 calories per kilogram. The chief deficiency of this fuel is its tendency to decompose and lose caloric value upon extraction from older deposits.

Brown coal is also found in large quantities, approximately 95 percent being located in the Jiu Valley at Petrosani, Lupeni, Vulcan, and Livazeni. Smaller deposits also exist in northern Transylvania and in the regions of Bacau, Cluj, and Stalin. In the Jiu Valley, extraction is limited to two types of strata, 20-60 meters thick and 1-5 meters thick. Brown coal in the Jiu Valley can be used successfully in industry and is an especially good locomotive fuel. Brown coal from the Lupeni region can be made into coke since its composition is close to that of black coal. In 1939, production of brown coal and lignite totaled 2,183,000 tons. The output in 1948 again exceeded 2 million tons. Present plans call for production of 8 million tons by 1955. [Possibly indicates all types of coal.]

Peat, found principally in Transylvania and in the Danube delta, was exploited on a very small scale before 1946. (2,3)

In addition to the various types of coal, petroleum is an important source of power. The principal deposits are in the regions of Prahova and Dambovita. Rich reserves are also located in the regions of Bustenari and Campina. Annual production of petroleum in Rumania in thousands of tons was as follows:

<u>1916</u>	<u>1929</u>	<u>1932</u>	<u>1936</u>	<u>1937</u>	<u>1938</u>	<u>1939</u>
938	4,650	7,213	8,720	7,190	6,642	6,292
<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>1944</u>	<u>1945</u>	<u>1946</u>	
5,920	5,500	5,665	3,525	4,680	4,250	

A third source of power is natural gas. Rumanian natural-gas deposits are, for the most part, located in Transylvania, principally in the vicinity of Sarvasul. The gas is almost pure methane. Annual production in millions of cubic meters between 1939 and 1944 was as follows:

<u>1939</u>	<u>1940</u>	<u>1941</u>	<u>1942</u>	<u>1943</u>	<u>1944</u>
358.5	334.7	362.0	470.8	608.0	474.3

Production in 1948 rose to 1.3 billion cubic meters.

Wood is still an important source of power. The forested areas of Rumania consisted of approximately 6.5 million hectares before World War II. The annual growth of forest was estimated to be 16 million cubic meters of wood, whereas annual cutting was 20 or more million cubic meters.

Water power resources have been utilized to a relatively small degree in the past. In 1934, there were only 92 hydroelectric stations with a combined output of 52,000 kilowatts. Present output of hydroelectric stations does not exceed 75,000 kilowatts, or 3.3 percent of the country's minimum capacity. (2)

- 2 -

RESTRICTED

RESTRICTED

STAT

Thus, despite the abundance of cheap power sources as represented by streams, brown coal, and methane, until recently firewood and petroleum have been the chief sources of power. The annual average production of power according to source, between 1937 and 1949, was as follows:

	<u>1937 - 1939</u> (%)	<u>1950</u> (%)
Wood	28.7	--
Coal	25.9	19.8
Petroleum	26.1	20.8
Natural gas	17.2	40.3
Hydroelectric	2.1	8.0
Other fuels	--	2.1

Expendable natural resources which must be preserved for the future welfare of the country provided 70 percent of the power output of the RPR. Inexhaustible sources provided only 30 percent. (1,2)

The solution to this problem is sought in the electrification plan which proposes to make cheap electricity the chief source of power in the RPR. Annual production of Rumanian electric power stations in millions of kilowatt-hours was as follows between 1938 and 1949:

<u>1938</u>	<u>1940</u>	<u>1941</u>	<u>1943</u>	<u>1946</u>	<u>1949 (plan)</u>
1,148	1,130	1,170	1,600	700	1,350

This electrical energy was produced as follows (in millions of kilowatt-hours):

	<u>1938</u>	<u>1940</u>	<u>1941</u>
By stations for general use	568	529	540
By stations for industrial use	580	601	630

Total output of electric power stations throughout the country according to type of station (in thousands of kilowatts) is as follows:

	<u>1938</u>	<u>1940</u>	<u>1941</u>	<u>1947</u>
Total output	510.5	504	533	702
By stations for general use	262.5	250	263	342
By stations for industrial use	248.0	254	270	360

The output of stations for general use according to type of generator is as follows:

	<u>1938</u> (%)	<u>1947</u> (%)
Steam-driven turbine	70.0	37.3
Diesel	15.0	54.8
Hydroelectric	14.6	7.6
Simple oil engine [sic]	0.4	0.3

The division of electric power stations for general use, grouped according to output, as of 1 January 1948, was as follows:

- 3 -

RESTRICTED

RESTRICTED

STAT

<u>Output Groups</u> (kw)	<u>No of Sta</u>	<u>Total Output</u> (1,000 kw)	<u>Av Output</u> (kw)
0-100	69	6.0	87
100-1,000	87	34.8	400
1,000-5,000	19	40.6	2,135
5,000-10,000	6	44.3	7,380
10,000-25,000	6	103.4	17,230
25,000-50,000	1	28.0	28,000
50,000-100,000	1	85.5	85,000

In 1950 there were no stations capable of producing 100 megawatts of power. Thirty-four percent of the stations will produce 100 megawatts or over in 1955, and 38 percent in 1960.

The total output of electric energy by hydroelectric stations during 1948 - 1949 was 16 million kilowatt hours. (1,2)

Water reserves represent a power output of more than 5 million kilowatts. If it were calculated that .6 kilogram of conventional fuel are required per kilowatt-hour (7,000 Kcal / [large calories] per kilogram) and the total energy consumption is 20 billion kilowatt-hours per year, Rumanian water power reserves would be the equivalent of 12 million year tons of conventional fuel.

Under the electrification plan of the RPR, power from hydroelectric and thermoelectric stations will represent 8.7 percent of the total energy output of the country in 1951. This will rise to 21.2 percent in 1955 and 50.2 percent in 1960. In the next 10 years, 13 thermoelectric stations with an installed power of 1,039,000 kilowatts will be constructed, chiefly for the use of low-grade fuel. Thus, for example, the Petrosani thermoelectric station will utilize low-grade coal which is not used at present, as well as waste products of the Hunedoara coke enterprise. The stations at Filipesti-De-Padure, Doicești, and Valisoara will consume lignite in place of high-grade fuel.

The reduction of the use of high-quality fuel for thermoelectric production is planned as follows:

	<u>1950</u> (%)	<u>1955</u> (%)	<u>1960</u> (%)
High-grade fuel	93	57.6	43
Low-grade fuel	7	42.4	57

Large stations (over 100 megawatts) equipped to produce steam at 100 atmospheres of pressure at 550 degrees centigrade will be constructed to utilize low-grade fuel. Up to the present, the only boilers available were capable of a maximum pressure of 40 atmospheres. The Loeffler boiler of the Grozavesti plant is the only high-pressure boiler now in use. High-pressure boilers are important for their fuel economy. An increase in pressure from 15 atmospheres at 350 degrees centigrade to 30 atmospheres at 450 degrees centigrade effects a reduction of 25-30 percent in fuel. A further increase to 100 atmospheres at 480 to 500 degrees centigrade leads to an additional 13-14 percent reduction.

The use of low-grade fuels will necessitate the construction of larger power stations capable of efficient burning of inferior materials. Such stations could utilize fuels which contain large amounts of cinders and slag and have a high moisture content. The saving of petroleum products alone is illustrated by the following table. The production of electrical energy from petroleum products in percentage of total energy produced will be reduced as follows:

- 4 -

RESTRICTED

RESTRICTED

STAT

	<u>1950</u>	<u>1951</u>	<u>1953</u>	<u>1955</u>
Fuel oil	19.6	14.0	11.6	9.3
Diesel oil	9.6	8.04	7.75	3.63
Total	29.2	22.04	19.35	12.93

The construction of large thermoelectric stations will permit the formation of widespread electric power systems throughout the country. These systems will be interconnected wherever possible. In remote areas, regional networks will be formed. High-tension lines carrying 220 kilovolts will transport current between systems. Lines connecting stations will carry 60-110 kilovolts.(1) The expansion of the power network will permit the exchange of electrical energy with Bulgaria. On the basis of an agreement between the two countries, signed in July 1949, a high-voltage line has been completed between Bucharest and Ruse to supply that region of Bulgaria with power for industrial and agricultural use. In the future, when the Bulgarian portion of the system is completed, portions of Rumania will receive cheap hydroelectric power from Bulgaria.(2)

Industry will consume approximately 60 percent of the total electrical energy in the RPR. Fifty percent of this will be used in processes that require high temperatures, such as those in the chemical industry. Thirty percent will be used in low-temperature processes and operations. Twenty percent will be used to operate machinery. Low-temperature processes are those in which boilers have a maximum temperature of 200 degrees centigrade.(1)

Another large consumer will be agriculture. At the beginning of 1950, only 427 or 3.3 percent of all villages used electricity, while at the same time 92.5 percent of the cities were electrified. The electrification of agriculture will be pressed, since it is estimated that one kilowatt of power does the work of eight agricultural workers. Small power stations will be constructed in rural areas for immediate local use. These stations will produce up to 500 kilowatts each, for a total of 40,000 kilowatts by the end of the Five-Year Plan. Additional small stations will be established to operate small-scale enterprises utilizing local agricultural raw materials. Such enterprises will engage in the extraction of cotton seed, the retting of hemp, and the production of powdered milk, preserved foods, and other items.(1,2)

Urban electrification, too, will be increased. At present, Bucharest is supplied by a whole group of electric power stations. Among them are the Grozavesti steam-turbine station, the Filaret diesel-powered station, which generates 11,900 kilowatts, the Dobresti hydroelectric stations, generating 16,000 kilowatts, and the Situl-Golesi and other stations formerly owned by the Concordia Company. Stations once owned by Concordia supply the city with 145 million kilowatt-hours annually.

The Rumanian electrotechnical industry comprised 61 enterprises with a total of 3,744 workers, as of 15 October 1947. Gross output of these enterprises in 1939 was 700 million lei, or approximately one percent of the gross output of production in all Rumanian industry.

SOURCES

1. Bucharest, Probleme Economice, Oct 1951
2. Moscow, Elektrichestvo, Apr 1950
3. Probleme Economice, Mar 1951

- E N D -

- 5 -

RESTRICTED